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NOTES ON THE VEGETATION OF EUCLA DISTRICT, W.A.

(with brief account of botanical collections represented in Melbourne Herbarium).

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Introductory.

Eucla is situated on the coast of the Great Australian Bight, about 8 miles west-south-west of the South Australian border (*viz.*, the 129th meridian of east longitude, which meets the sea at Wilson Bluff). Its sandy harbour was discovered about 1867 and, within the same year, surveyed and named " Port Eucla " by Captain Douglas (President of the South Australian Marine Board). The name is said to be a corruption of the aboriginal *Yirculyer* (or *yer-coloya*)—actually applied to a bluff (probably Wilson Bluff) near the present settlement which natives knew as *Chiniala.*

In *Wild Life 10*: 119 (Mar., 1948), P. Crosbie Morrison wrote thus of the place: " On the map it stands out, usually in fairly bold lettering, all by itself. It looks so lonely, and yet, somehow, so important." In the *Western Australian Year-book for 1894–'95*: 33 (1896), Malcolm A. C. Fraser listed Eucla in the section devoted to " Principal Towns ", with the somewhat irrelevant description:

> A small settlement on the eastern boundary of Western Australia, about 520 miles east of Esperance and about an equal distance west from Adelaide. . . . Population, 24 males, 8 females. There is a small jetty, a police station, and a Customs office. Camel teams from South Australia occasionally pass through.

By 1904 the population had risen to 60; it reached a peak in 1927–28, but Eucla declined completely after the multiplex telegraph channel along the transcontinental railway line was opened in 1929. The settlement at present consists of a single inhabited building—the " Hotel Eucla "—with one family, and a petrol station. This has become a principal refuelling and stopping place on the great Eyre Highway, and about 60 cars now pass by each day; it is also a focal point from which to visit the more spectacular limestone caves of the nearby Nullarbor Plain.

The Physical Environment.

That vast monotonous plateau of horizontally-bedded Miocene limestone, constituting Nullarbor Plain, reaches the ocean as a line of vertical cliffs from 200 to 400 feet high; but, for the 150 miles between Eyre and Eucla, this escarpment swings inland—to a maximum distance from the sea of about 27 miles (near Madura), leaving a flat coastal plain. The cliff-line, known as "Hampton Range" and "Bunda Scarp", doubtless marks the position of a former shore-line. Various authorities, e.g., H. P. Woodward (1890) and J. T. Jutson (1934), have associated the cliffs with a fault scarp; however, the present spindle-shaped coastal plain (from Eyre to Eucla) probably owes its origin to a post-Tertiary, slight eustatic change in sea-level—it is largely covered with sand-dunes, both consolidated and mobile, interspersed with extensive saline flats. Eucla, situated at the very narrow eastern extremity of the littoral plain and close to the limestone escarpment, is remarkable for its high, moving dunes which have already obliterated several of the old telegraph station buildings and may eventually overwhelm the whole settlement.

The annual rainfall at Eucla (based on mean monthly precipitation over a period of 60 years) is almost exactly 10 inches (*cf.* 11·7 inches at Eyre 150 miles westward); streams are lacking, and no fresh water is to be found at the surface throughout the thousands of square miles covered by the Nullarbor region.

Temperature records (over a period of 60 years) indicate a mean yearly maximum of 72·7° F. and mean minimum of 53·7° F., with frequent very high temperatures during summer. Figures for relative humidity are remarkably uniform throughout the year, averaging 60.

Vegetation.

On the coastal plain three formations predominate—(1) MALLEE (with associations of *Eucalyptus oleosa, E. incrassata–E. gracilis*, umbrageous *Acacia sowdenii*, and *Melaleuca pubescens* toward the cliffs); (2) SALTBUSH (an alliance of *Arthrocnemum* and *Salicornia* species, with such smaller halophytes as *Hemichroa diandra* and *Wilsonia backhousei* on intermittently damp saline flats); and (3) the "NITRARIETUM" on moving dunes (immense isolated clumps of *Nitraria schoberi*) which passes into a narrow zone of littoral plants along the ocean beach. The strictly littoral flora includes a number of plants (often succulent) having an extremely wide range around temperate Australia—notably *Atriplex cinerea, Zygophyllum billardieri, Scævola calendulacea* and *Olearia axillaris*. The *Arthrocnemum* (or "samphire") community, chiefly of *A. halocnemoides* and *A. leiostachyum*, occupies a large area of coastal plain—probably as great as that of any other ecological unit thereon.

The Mallee formation extends all along Hampton Range scarp itself, and for a short distance inland, dominated by *Eucalyptus oleosa* in varying association with other small, often bushy trees (*Melaleuca pubescens, Myoporum platycarpum, Acacia sowdenii, A. oswaldii, Exocarpos aphyllus,*

Santalum acuminatum, &c.) and such taller shrubs as *Heterodendron oleifolium*, *Pittosporum phillyreoides*, *Geijera linearifolia*, *Melaleuca quadrifaria* and *Eremophila alternifolia*. There is also a diversity of small shrubs fringing the limestone cliffs, e.g., *Rhagodia preissii*, *Templetonia battii*, *Pomaderris forrestiana*, *Westringia rigida*, *Eremophila scoparia*, *E. weldii*, *E. glabra*, *Olearia exiguifolia*, *O. muelleri* and *O. magniflora*. Ephemeral herbs of the *Cruciferæ* and *Compositæ* abound in season.

As one progresses north from the scarp, arboreal growth immediately thins out and soon ceases, giving place to a Saltbush ("shrub-steppe") formation which stretches, unrelieved to the horizon, over a remarkably level surface. *Chenopodiaceæ* is by far the largest plant family among perennials on this featureless plateau, both by number of species and area occupied, the most frequent members near Eucla being *Atriplex nummularia*, *A. hymenotheca* (syn. *A. vesicaria*), *Bassia uniflora*, *Kochia erioclada*, *K. sedifolia*, *K. oppositifolia*, *K. tomentosa* and *Enchylæna tomentosa*—all species of very wide distribution in the Commonwealth. Grasses are also conspicuous, belonging chiefly to the genera *Danthonia* and *Stipa*. The lichen flora of the great saltbush region north of Eucla, although calciphilous and highly drought-resisting, is varied; but it has neither been collected nor studied adequately. Frequent among the larger terrestrial species are *Urceolaria scruposa*, *Psora decipiens*, *Lecanora sphærospora* (and several other unidentified species), *Parmelia australiensis*, *P. semiviridis* (syn. *P. hypoxantha*), *P. versicolor*, *Caloplaca fulgens* var. *bracteatum* and *Buellia subalbula*.

The numerous sink-holes, caverns and "dongas" (larger, shallower areas of subsidence on the limestone), which are scattered over the Nullarbor Plain, afford some protection from wind. Under the moister conditions prevailing at these favourable spots, a number of thinner-leaved and more tender plants is able to thrive; here one may find several kinds of moss, the fern *Pleurosorus rutifolius*, sundry grasses, *Parietaria debilis*, *Lavatera plebeja*, *Nicotiana goodspeedii*, *Solanum nigrum* and *Galium gaudichaudii*. On dongas more remote from the coast, the Sturt Desert Pea (*Clianthus formosus*) becomes a landscape feature.

A few perennials are wholly or largely confined to the vicinity of Hampton Range, notably *Templetonia battii* and *Olearia exiguifolia*—both known only from the limestone region between Fowler's Bay (S.A.) and Eyre (W.A.), with Eucla as the centre of development. *Pomaderris forrestiana* and *Frankenia densa* range from Eucla as far west as Widgiemooltha (near Norseman) and Israelite Bay respectively. *Melaleuca quadrifaria* occurs at Eucla pass (on the limestone escarpment) and also on the Fraser Range (W.A.), but is unknown elsewhere. A surprising occurrence at Madura pass, and the only record for Western Australia, is that of the cane-like grass *Stipa breviglumis*, otherwise known only from the Flinders and Mt. Lofty Ranges in South Australia and from a few dry rocky places in central-western Victoria; the name is incorrectly rendered "*S. breviculmis*" by Willis in *Mem. nat. Mus., Melb. 15*: 50 (1951).

Explorers and Plant Collectors.

The first white man to venture into the district was Edward John Eyre, who came abreast of Eucla early in March, 1841, while making his epic journey westward on foot along the shores of the Bight; but the very nature of this extraordinary feat precluded any collecting of plant or animal life.

Captain E. Alfred Delisser [the name is variously spelt Delisser, " Delissier " and " Delessier " in John Forrest's *Explorations in Australia*, 1875] was a squatter and surveyor in search of good grazing land. In July, 1861, and again in June, 1865, he made excursions from Fowler's Bay (S.A.) onto the limestone plateau north of Eucla, coining for it the apt sobriquet " Nullarbor "—from the Latin *nulla arbor* (no tree)—and reporting favourably on its pastoral potentialities. Delisser's few botanical specimens found their way to F. Mueller and are now in Melbourne Herbarium, with the label " far to the N.W. from the head of the Great Bight " (e.g., *Rhagodia crassifolia, Kochia tomentosa, Atriplex hymenotheca* and *Threlkeldia diffusa, Eremophila alternifolia, E. scoparia* and type of *E. delisseri, Cephalipterum drummondii*).

Next came surveyor-explorer John Forrest (later Sir John, C.M.G.) who stayed at Eucla for twelve days in July, 1870, during the historical trip from Perth to Adelaide on horseback, with party of five. Forrest was reprovisioned by ship at Eucla, where he gathered at least 22 botanical specimens. The entire collection of the expedition was immediately dispatched to F. Mueller who described *Eremophila weldii* (from Point Dover and Eucla) as early as December, 1870. On the same page (109) of the *Fragmenta Phytographiæ Australiæ* vol. 7 (1870) Mueller gave a list of Forrest's plants " *e vicinia portus Eucla* "—apparently the first publishcd catalogue of the district's flora.

Explorer Ernest Giles visited the same seaport in March, 1875, but it is not known whether he too collected samples of its flora (no specimens are ascribed to him in volumes 9–12 of Mueller's *Fragmenta*). Police-trooper Thomas Richards (of the Fowler's Bay district, S.A.) made several trips toward Eucla between 1875 and 1877, and his plant collectings also came to F. Mueller at Melbourne.

The overland telegraph line reached Eucla from Adelaide in July, 1877, and from Perth in December, 1877. Thereafter, the story of botanical exploration in this district very largely revolves around Eucla telegraph station. John David Batt, a telegraph linesman and keen walker, inhabited the district for at least a decade (1886–1896). His very extensive contribution of plants to Baron von Mueller, during those years, amounted to far more than all other Eucla collections combined. Represented among thc many specimens were several new species (notably *Templetonia battii, Melaleuca quadrifaria, Brachycome tatei* and *Eremophila battii*). He collected also the type material of *Eriostemon gibbosus* and *Helipterum battii*—both from the Norseman district.

William Webb succeeded George Maxwell (who died in December, 1879) as Mueller's botanical collector in the Albany district, W.A. He touched at several remote parts of the south-east coast, and in 1893 transmitted material from as far away as Eucla settlement.

Between 17th June and 13th September, 1896, A. Mason (a Government official) examined a large tract of the Nullarbor lying between Kurnalpi and Eucla; he claimed to have discovered " some millions of acres of some of the finest pastoral and agricultural country in the world ", but also reported on the very poor water resources. Apparently no plants were gathered for preservation, or, if so, their present whereabouts is not known. F. W. Beere sent several annotated specimens from Eucla to Melbourne Herbarium in July, 1896.

During quite recent years J. H. Willis and D. S. Kemsley have collected in the neighbourhood of Eucla. The former botanist spent two days between the Head of the Bight and Madura cliffs (a lineal distance of about 250 miles), while travelling with the Russell Grimwade Expedition in August, 1947; specimens of some 30 species of vascular plants were taken on that occasion. Kemsley worked over the same area, and well inland also, spending the whole month of January, 1952, with the Nullarbor Caves Expedition; he returned for a shorter period of cave-exploring in December of the same year, and his collections amount to some 70 species of vaseulares and 20 of mosses.* All these collections have been added to the older exsiccatæ already in Melbourne.

H. B. S. Womersley (Feb., 1954) obtained a suite of algal specimens from Wilson Bluff, on the State boundary east of Eucla; these are now housed in the Adelaide University Herbarium.

In view of the isolation and undoubted botanical interest attaching to Eucla district, remarkably little has ever been published, and there is still no comprehensive account of the flora. It is hoped that the foregoing remarks will focus attention on this need, and following is a list of the Eucla collectors whose contributions are preserved in the National Herbarium of Victoria, Melbourne:

List of Collections (*in* MEL), *chronologically arranged.*

Delisser, E. A.—July, 1861; June, 1865.
Forrest, J.—July, 1870.
Richards, T.—1875–77.
Carey, H. S.—1877.
Oliver, J.—1881–84.
Turner, G. R.—1885.
Batt, J. D.—1886–96.
Webb, W.—1893.
Beere, F. W.—July, 1896.
Ryan, C. O. (Mrs.)—1895–96.
Willis, J. H.—Aug., 1947.
Kemsley, D. S.—Jan. & Dec., 1952.

References.

MUELLER, F. J. H.—*Fragmenta Phytographiæ Australiæ 7*: 109 (Dec., 1870).

MORRISON, P. C.—" We went west (Eucla to Cocklebiddy) " in *Wild Life 10*: 119–122 (Mar., 1948), with landscape photos.

WILLIS, J. H.—" Botany of the Russell Grimwade Expedition " in *Memoirs of the National Museum*, Melbourne *15*: 34–37 (Mar., 1951).

KEMSLEY, D. S.—" The mysterious Nullarbor Plain " in *Walkabout 24*: 17 (Nov., 1957).

ANON.—*Australian Encyclopædia 3*: 411 (1958).

* A special report will be published on the distribution of moss species throughout the Nullarbor region.